

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

March 24, 1863.—W. H. Flower, Esq., F.Z.S., in the Chair.

NOTES ON TWO NEW SPECIES OF MAMMALS. BY J. K. LORD, F.Z.S., NATURALIST TO THE BRITISH NORTH-AMERICAN BOUNDARY COMMISSION.

My principal reason for bringing to your notice this evening two animals, a Musk Rat and a *Lagomys*, that I propose making new species, is to elicit from the zoologists who are before me opinions on that most debatable of all debatable questions, Where does well-marked variety end, and species begin? Is it enough if you have decided differences of habit, size, colour, and locality—variations that are always constant, but without well-defined *structural* differences, or these, if any, but trivial in character; or must there of necessity be decidedly marked variations in *structure*, particularly in the skull and dental formulæ, as well as in habit, colour, size, and habitat, to constitute a species? I now have on the table four animals, two of which are described and figured, and two I believe specifically distinct from the former; and although the latter, as I shall be able to point out to you, present differences of habit most singularly well marked, and strongly defined differences of size and colour, habitat, and range, yet an examination of their skulls shows only some slight differences, principally in size.

First, then, of the Musk Rat. The one which I believe is the well-known *Fiber zibethicus* (Cuv.) makes its holes in the clayey banks of streams and pools where the water runs slowly. The entrance is always below the surface of the water; the hole is dug up in a slanting direction till above the water-level. A stage or flat place is then cleared, which constitutes his dining-, drawing-, and bed-rooms; leading to the entrance of his mansion are a large number of open cuttings, running in all directions, cut or dug in the mud at the bottom of the water. When foraging about, as he usually does about twilight, if alarmed, he dives at once into one of these cuttings, and, rushing rapidly through it, stirs up the mud, and so fouling the water, completely and effectually conceals himself.

The other Musk Rat, which I propose to make a new species, and to call *Fiber osoyoosensis*, having obtained it at a large lake (Lake Osoyoos) situated between the Cascades and Rocky Mountains, and through which the boundary-line (the 49th parallel of latitude) runs, differs in size, in colour, in locality, but particularly in habits, from the preceding.

This fellow chooses as his haunt a clear pond or lake, and in water from 3 to 4 feet deep constructs a house of bullrushes, in form conical, built up from the bottom—how, I am at a loss to imagine,—the roof cleverly arched over into a domed shape, and raised about a foot above the water. Up in this dome, skilfully constructed, is his suite of apartments, the entrance to which is far below the sur-

face of the water. His habits very nearly approximate those of the Beaver : he swims about boldly in the day-time, but dives rapidly on the approach of danger. If a dead or badly wounded duck be left on the pool, it is at once seized on, towed into the house, and devoured.

I am quite satisfied, from careful observation, that the Musk Rat is a carnivorous beast whenever he has a chance ; and the straight, sharp-cutting, strong incisor teeth are well adapted for the indulgence of such propensities.

If there were no rushes growing where the mud-rover lived, it might be assumed that he dug a hole into the bank from lack of material to build a house ; but I have often seen the rushes growing abundantly where he has chosen his mud hut, offering every facility for architectural pursuits, had he so willed. On the other hand, had the rush-builder been precluded from finding a mud-bank in which to construct his mansion, it might have been supposed that he had resorted to making a hut with rushes on that account.

This *Lagomys*, which I propose making a new species, and calling, from its being so much less than any other, *Lagomys minimus*, lives on the summit of the Cascade Mountains, at an altitude above the sea-level of about 7000 feet. He chooses as his residence loose piles of rocks and stones. He is shy and wary, and on the slightest noise takes a header into a crevice. When everything is again still and quiet, he cautiously peeps out, and, growing bold in the silence, climbs up on the top of a stone, and, sitting on his hind legs like a begging dog, gives a sharp shrill cry ; and so curiously deceptive is it that I constantly imagined the sound was far distant when it has been close to my feet. It was in October, when I was on Ptarmigan Hill, a high mountain in the Cascade range ; the snow was just beginning to fall ; and all these little fellows were then busily employed in making large nests, in the crevices between the stones, of dry grass and leaves, evidently for their winter sleep, and perhaps store-house. I should have made much more extensive observations, had not the prospect of coming snow driven me down.

This *Lagomys*, which is much larger, and which I believe to be the same as the one described and figured by Sir J. Richardson (pl. 19) as *Lepus (Lagomys) princeps*, I first saw at Chilukweyuk Lake, a large lake on the west side of the Cascades, close to the boundary-line, and next on the trail leading from Fort Hope on the Fraser River to Fort Colville on the Columbia, both fur-stations of the Hudson's Bay Company. The animals were in a narrow gorge, among large heaps of loose stones that had rolled down from the high precipitous sides of the gorge. I saw them busily feeding on grass, much after the fashion of a rabbit, eating a few mouthfuls, then stopping and sitting up and quietly taking a survey of things in general. At this period, later in the year, about the same date at which in the year preceding I had seen *Lagomys minimus* making its nest, not a trace of a nest could I see, nor any evidence of an attempt to make one. It was at the same period of the year, and about the same altitude, that I saw this *Lagomys* at Chilukweyuk Lake ; but no nest, nor a

shadow of an attempt to construct one, was there to be seen. Early in October I returned again by the trail I had used in going from Fort Colville to Fort Hope; the snow had fallen to about the depth of 6 inches, completely covering up the rocks and stones. All the little fellows had disappeared, and, although I searched most carefully, there was not a hole nor track in the snow to show they had ever left their quarters. It was quite impossible a nest could have been made in the interim; hence I feel perfectly sure they hibernate in deep holes without a nest, whereas *Lagomys minimus*, living at a much greater altitude, makes a large nest of hay to pass his winter sleep in.

The two new animals may be described as follows:—

FIBER OSOYOOSSENSIS, Lord, sp. nov.

Sp. char.—In total length $3\frac{1}{4}$ inches shorter than *Fiber zibethicus* (Cuv.); in general size much smaller. General hue of back jet-black; but, the hair being of two kinds, if viewed from tail to head it looks grey—the under fur being fine, silky, and light grey in colour; concealing this on the upper surface are long coarse black hairs; the belly and sides somewhat lighter; head broad and depressed; neck indistinct; ear small, upper margin rounded; eye small and black; the feet, legs, and claws are so exactly like those of *Fiber zibethicus* that it would be useless to describe them again; whiskers long, and composed of about an equal number of white and black hairs; incisors nearly straight, on the external surface orange-yellow.

The skull differs from *Fiber zibethicus* in being much smaller, $2\frac{1}{8}$ inches in length, $1\frac{1}{8}$ inch in width, very much shorter from the anterior molar to incisors; nasal bones much more rounded at their posterior ends, the superior outline less curved; postorbital process not nearly so much developed; the cranial portion of the skull in its upper outline is much less concave, and smoother; superior outline of occipital bone not so prominent or strong; incisors shorter and much straighter; molars much smaller, but in general outline similar.

LAGOMYS MINIMUS, Lord, sp. nov.

Sp. char.—Differs from *Lepus (Lagomys) princeps* of Sir J. Richardson (F. B. A., i. p. 227, pl. 19) in being much smaller. Predominant colour of back dark grey, tinged faintly with umber-yellow, more vivid about the shoulders, but gradually shading off on the sides and belly to dirty white; feet white, washed over with yellowish brown; ears large, black inside, the outer rounded margin edged with white; eye very small and intensely black; whiskers long, and composed of about an equal number of white and black hairs.

Measurement: Head and body $6\frac{1}{2}$ inches; head 2 inches; nose to auditory opening $1\frac{1}{4}$ inch; height of ear from behind 1 inch.

The skull differs in being generally smaller; the cranial portion of the skull in its superior outline is much narrower and smoother. The nasal bones are shorter and broader, and rounded at their posterior articulation, instead of being deeply notched as in *L. princeps*.

Distance from anterior molar to incisors much less; auditory bullæ much smaller. Incisors shorter and straighter, and very deeply grooved on the anterior surface. Molars smaller, but otherwise similar in form. Length of skull $1\frac{1}{4}$ inch.

General differences from *Lagomys princeps*—*First*, in being smaller, $1\frac{1}{2}$ inch shorter in total length; the ear, measured from behind, $\frac{1}{4}$ inch shorter: the colour generally darker, especially the lower third of the back.

Secondly, in the structural differences of the skull; for although these differences are not prominent or well defined, yet they are unquestionable variations.

Thirdly, in the habit of constructing a nest of hay for the winter sleep, and in living at a much greater altitude.

April 21, 1863.—E. W. H. Holdsworth, Esq., F.Z.S., in the Chair.

DESCRIPTIONS OF SEVERAL NEW SPECIES OF WORMS BELONGING TO THE ANNELIDA ERRANTIA AND SEDENTARIA OR TUBICOLA OF MILNE-EDWARDS. BY W. BAIRD, M.D., F.L.S.

The following very interesting species of Annelides were collected by Mr. Lord, during the time he was engaged as naturalist on the N.W. American Boundary Commission. They appear to me to be undescribed. They will be figured in the forthcoming report of the labours of the commission.

1. LEPIDONOTUS INSIGNIS, Baird.

This is a very fine species of the genus *Lepidonotus*. It is rather more than 3 inches long, and is nearly $\frac{1}{2}$ an inch in breadth, exclusive of the setæ of the feet. On the upper surface, the body is of a whitish colour, marbled with black. The sides, which are covered by the elytra, are white, and a broad black line runs down the centre of the dorsum throughout its whole length. The feet are encircled with fine black circular lines. The elytra, eighteen pairs in number, are oval, white, with black dots on the outer sides and centre, and they are marked with a black semicircular patch on the inner edge. They do not overlap each other, except near the head. On the body of the animal they are wide apart, leaving the centre of the back exposed. The under surface is of a bluish-black colour, with a narrow white line running down the centre. The proboscis is large and wrinkled, and the jaws are of a reddish-brown colour. The antennæ are five in number, the central one being nearly three times as long as the external pair, and of a pure white colour; the internal and external pairs white, ringed with black. The feet are very prominent, strong, rounded, conical, and armed with seven or eight stout brown bristles. The second branch is extremely small, and sends off two or three very small white setæ. The superior cirrus is tolerably long and sharp-pointed; it is pedunculated, the peduncle being stout, conical, and of a deep black colour. The inferior cirrus is short, conical, and sharp-pointed. The last segment of the body is terminated by two tolerably stout, but not long, cirri.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

2. LEPIDONOTUS LORDI, Baird.

This species is about 3 inches long, and rather more than one-third of an inch in diameter at the broadest part of the body. It tapers gradually from the head to the tail, which is only about $\frac{2}{15}$ ths of an inch broad. The colour is of a light brown, a broad line of a much darker brown running along the whole length of the centre of the back. On the under surface, a groove runs down the centre of the body throughout its whole length. The elytra are thirty-five pairs in number, thin, membranous, and of a light-brown colour. The first two overlap each other slightly in the middle; but, for the rest of its length, the centre of the back is uncovered. The antennæ are five in number, the central one short, of much the same length as the internal ones; the two external the longest, white, with a bright black ring round the upper part, but leaving the point white, which is acute at the apex. The feet are tolerably stout, and the two divisions are both furnished with sharp, but curved, pointed bristles. The superior cirri are white and of a moderate length; the inferior ones very short.

A good many specimens of this species were taken, and they were all found nestling under the shell, and occasionally coiling themselves under the foot, of the animal of *Fissurella cratitia*.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

3. LEPIDONOTUS GRUBEI, Baird.

This species is about 2 inches long, and $\frac{1}{2}$ an inch broad. The body underneath is of a uniform brown colour; above it is whitish, mottled with black. The elytra are eighteen pairs in number, nearly round, rough, with small tubercles, edged by a slightly raised margin, and mottled with black and white. They do not meet each other in the centre, but leave a portion of the back uncovered. The superior cirri are rather long, blunt-pointed, pedunculated, marked with a black spot at the base, where they issue from the peduncle, and are ringed with black a little distance from the extremity. The inferior cirri are short and acute-pointed. The feet are broad, and the bristles of both branches are stout, of a bright brown colour, and toothed on one edge near the extremity. The antennæ are five in number, and are all short and nearly of equal length.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

4. LEPIDONOTUS FRAGILIS, Baird.

This species, owing to its brittle character, is in too bad a state to describe accurately. It is about $2\frac{1}{2}$ or 3 inches long, and is rather narrow. The scales or elytra appear to be very thin and membranous; but as they are deciduous, it is difficult to ascertain the number, especially as the worm is broken into several pieces. The superior cirri are stout and club-shaped at the tip. There appear to be no ventral cirri on the feet, and the superior cirri become nearly obsolete on the lower half of the body.

It was found by Mr. Lord adhering to a starfish; "but," he says, "it is next to impossible to obtain one perfect, as they break them-
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selves to pieces on the slightest touch, or however carefully killed." In this respect it resembles a species of Annelide belonging to the group of vermiform Aphrodisians, described by Risso as occurring in the Mediterranean, under the name of *Eumolpe fragilis*.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

5. NEREIS FOLIATA, Baird.

This Nereid is of a dark grey colour above, and of a lighter hue underneath, somewhat iridescent. It is 15 inches in length, and at the broadest part is about $\frac{1}{2}$ an inch in breadth. It tapers gradually towards the tail, which terminates in two short, blunt, caudal styles. The first or occipital segment of the body is about twice the length of the second. The tentacular cirri are unequal, and vary in length: in the largest and best-developed specimen the longest are only about as long as the first two segments; while in another specimen, nearly of the same size, they are nearly equal in length to the first four segments, and in one or two small specimens, not a third the length of the two just mentioned, these cirri are equal in length to at least eleven of the first segments of the body. The shorter ones are only about half the length of the first segment of the body. The feet are well developed, the superior branchial appendages are large and in the form of a leaf, giving the animal at first sight the appearance of a species of *Phyllodon*. The antennæ are shorter than the palpi, which are strong and conical in shape.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

This species approaches very nearly to *Nereis virens* of Sars, from Newfoundland (*vide* Middendorf, *Sibirische Reise*, *Annulos.* 6, tab. i. figs. 2-6).

6. NEREIS BICANALICULATA, Baird.

This is rather a small species, about 2 inches long, and $2\frac{1}{2}$ lines in breadth. It is of a dull white colour, and is remarkable for having a channel running down both the dorsal and ventral sides. The channel on the dorsal surface is rather deep, commencing from the eleventh ring, and continues to the tail; the channel itself is quite smooth, the divisions or rings of the body not showing on its surface. On the ventral surface the channel shows marks of the divisions or rings into which the body is divided. The head is small, the antennæ about equal in length to the palpi, and the tentacular cirri are equal to about five or six rings of the body. The upper portion of the body is rounded, and not channeled; and the tail terminates in a round, blunt knob, without caudal filaments. The feet are rather small, but are rendered unusually distinct from the peculiar manner in which the rings or divisions of the body are interrupted by the channel running along the centre of the body. It tapers very gradually, and almost imperceptibly for some time, from the head to the tail.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

7. GLYCERA CORRUGATA, Baird.

This Annelide is about 4 inches in length, exclusive of the pro-

boscis, which, when exerted, is $\frac{3}{4}$ ths of an inch long, and is about 3 lines in breadth; the proboscis is 4 lines at its greatest diameter. The head is rather short and conical, and strongly ringed. The antennæ are somewhat broad. The feet are broad, composed of two lobes, and are destitute of branchial filaments. The bristles are jointed, and the setæ straight and sharp. The segments of the body are very numerous, composed of a double ring, the one on which the feet are set being the narrower of the two and raised; while the whole surface of the body, especially on the upper side, is densely, though not very strongly, corrugated throughout its whole length. The proboscis is densely scabrous, and covered with very short dark-coloured bristles. The body tapers to a narrow point posteriorly, and terminates in a loosely connected short lobe, armed at the extremity with a slightly curved, horny, sharp-pointed claw.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

8. SABELLARIA SAXICAVA, Baird.

This Worm lives in the rock. The tube in which it lodges is solitary, and is evidently hollowed out of the solid (though not very hard) rock by itself, and appears to be quite round.

The thoracic portion of the body is round; the abdominal flattened, with an impressed line running down through its whole length. The head is surmounted by an opercular disk composed of two rows of stout, dissimilar bristles (*paleæ*). The inner row consists of about ten stout, cylindrical, sharp-pointed bristles of a dark horn-colour, gradually increasing in size from the dorsal margin towards the ventral. The outer row consists of about eighteen bristles, not so stout, flattened, and finely denticulated on both sides for about half the length. The postoccipital segment of the body is long, of a dark colour, somewhat wrinkled, and marked with three or four fleshy tubercles, on each side. The thoracic feet are three pairs, and are broad, but short. As only one specimen was found, it was thought inadvisable to dissect the whole worm out; in consequence of which the extremity has not been seen. I am unable to say whether it terminates in a caudal appendage or not.

The length of the exposed portion of the worm is $1\frac{1}{2}$ inch, the breadth about 2 lines. Probably the part enclosed in the tube may be of about equal length.

Hab. Esquimalt Harbour, Vancouver Island (*Mus. Brit.*).

ON AN ILLUSTRATION OF THE MANNER IN WHICH BIRDS MAY OCCASIONALLY AID IN THE DISPERSION OF SEEDS. BY ALFRED NEWTON, M.A., F.Z.S.

Last summer, my friend Mr. Henry Stevenson, the Secretary of the Norfolk and Norwich Museum, showed me the singular specimen which, by his liberality, I now exhibit. It will be seen that it is the leg and mutilated foot of a French Partridge (*Caccabis rufa*, G. R. Gray), a great part of which is imbedded in a mass of clay. At my request he has since furnished me with the following particulars respecting it:—

“On the 8th of December 1860, Mr. Sayer, a bird-stuffer at Norwich, showed me the Partridge’s leg and ball of earth which I recently placed in your hands, and, in answer to my inquiries, gave me the following particulars :—‘A gentleman, whose name he did not know, but whose face was quite familiar to him as an occasional visitor to his shop, brought the leg to him a day or two before, stating that the bird to which it belonged had been seen, on a heavy-land farm in Suffolk, hobbling along in a very unusual manner, and was with little difficulty run down and secured. It was then found that the lower half of one leg was imbedded in a mass of earth, which



raised it considerably from the ground, and necessarily kept the limb in a bent position. The bird was half starved.’

“The lump, measuring $7\frac{1}{2}$ inches in circumference, and weighing $6\frac{3}{4}$ oz., had become as hard as stone, and certainly in that state accounted for the bird not having been able to free itself from the encumbrance. Two toes only are visible, of which one has the nail torn off level with the edge of the mass itself. From the upper part protrudes a short bit of straw, and this being entangled round the foot probably by degrees collected the soil, which may also have been hardened by the frost at night. The unfortunate bird may, too, have been wounded in the leg, and thus unable to endure the pain of removing the earth when it first began to accumulate. I have no reason to doubt Mr. Sayer’s statement, and believe he told me what

he heard from the gentleman. The leg, when I saw it, looked fresh where it had been cut off.

(Signed) "HENRY STEVENSON."

It will be remembered that Mr. Darwin, in his work on the 'Origin of Species,' speaks of the possibility of the seeds of plants being occasionally transported to great distances by being enclosed in earth adhering to the beaks and feet of birds; and he mentions the fact of his having "removed twenty-two grains of dry argillaceous earth from one foot of a Partridge," in which earth "there was a pebble quite as large as the seed of a vetch" (pp. 362, 363). Now the mass of clay I exhibit is enormously greater than the quantity of earth mentioned by Mr. Darwin, and is sufficient to hold the germs of a very extensive flora.

Apart from the statement of Mr. Stevenson, that the lump, when he first saw it, was "as hard as stone," and the contrast thereby afforded by the "fresh look" of the leg, a close examination of the specimen convinces me that the clay, as that gentleman suggests, accumulated gradually. The two toes which are visible have become distorted, and have accommodated themselves as well as they were able to the shape of the mass. I imagine also that the loss of the claw, noticed by Mr. Stevenson, has been experienced since the mass attained nearly its present size and shape; and it will be seen that the stump has perfectly healed over. Now all this must have taken some time; I do not venture to say whether days, weeks, or months. It is clear that, as the bulk and weight of the encumbrance increased, it would more and more interfere with the bearer's means of obtaining a livelihood; and hence, weakened by starvation, the bird was finally unable to rise, and met its death in the manner stated.

If, as I believe, the clay accumulated by degrees, it is obvious that there was once a time when the incipient mass was no heavier a burthen than the bird was able to bear in flight. What the actual limit was, is a question we have no means of determining; at least I am not aware of any experiments having been made tending to show what weight a Partridge is capable of supporting on the wing. But I trust I have said enough to justify me in bringing this before the Society as a singular illustration of the manner in which birds may occasionally aid in the dispersion of seeds.

DESCRIPTIONS OF TWO NEW GENERA OF LIZARDS (*HOLASPIS*
AND *PORIODOGASTER*, A. SMITH, MS.). BY DR. J. E.
GRAY, F.R.S., ETC.

Sir Andrew Smith, M.D., having most kindly sent to the collection of the British Museum two most interesting Lizards, which he has very properly named as the types of two new genera, I hasten to send to the Society a short description of each of them under the MS. names which Sir Andrew Smith has attached to them in his museum.

The first genus is allied to the family *Lacertinidæ*, and is at once known from all the genera of that group by the peculiarity of having

two series of broad band-like scales down the vertebral line of the back, which are continued on the upper surface of the base (and probably of the whole length) of the tail; but the single specimen which I have seen has evidently had the end of the tail reproduced and covered with abnormal scales. The tail is depressed, and has a series of prominent keeled scales, forming a dentated keel on each side.

This genus I consider forms a distinct family, which may be called *HOLASPIDÆ*, distinguished from *Lacertinidæ* by the form of the tail and the peculiarities of the scales.

1. *HOLASPIS*, A. Smith, MS.

Head pyramidal, depressed; crown covered with regular, many-sided shields; side of face shielded; nostrils nearly on the ridges near the front of a single scale with a shield in front of it; labial shields low; temple covered with small scales; eyes lateral; lower eyelids scaly; eyebrow covered with three large shields; ears large, oblong, erect, open; tympanum rather sunk; tongue slender, retractile (?); the apex deeply notched, acute. Body depressed, with a slight keel on each side of the belly. The back and upper part of the neck covered with whorls of narrow elongated keeled scales, with two series of smooth, oblong, transverse shields, one on each side of the vertebral bones. The belly covered with cross series of square smooth shields, placed in few longitudinal series. The throat and neck covered with small rather convex scales, and with a distinct collar formed of a regular series of large half-ovate scales. The legs rather depressed, covered with granular convex scales; the front legs with a series of broad smooth shields on the upper front side; the thighs with two (an upper and lower) series, and the hind legs with an inferior series, of smooth broad shields, like those on the front of the fore legs; the hind feet slightly fringed on the inner side; toes 5:5, elongate, slender, unequal; claws acute. The femoral pores small. Vent with a single half-oblong shield in front. Tail depressed, with a fringe of compressed close scales on each side, the sides covered with rings of small convex scales, and with two series of small broad band-like shields on the upper and lower surface.

Mr. Cope has pointed out to me that this genus agrees in many particulars with the genus *Placosoma* of Fitzinger, MS., described by Von Tschudi in an article on the family of *Eupleopoda* (Arch. für Naturg. 1847, pp. 50 & 58).

The scaling seems very similar; but the body of *Placosoma* is not said to be so depressed and fringed on the sides; and the small part of the tail that remains on the specimen described is not said to be depressed and fringed on the sides; and I can hardly believe that Von Tschudi would have overlooked such a peculiar form, and therefore I believe they are different.

Von Tschudi describes the scales on the upper surface of the small part of the tail that remains, which is only 3 lines long, as small, like those on the sides; but in Dr. Smith's genus the upper surface of the tail is covered with two rows of large shields, like the back.

Placosoma cordylinum is described from a specimen in the Museum at Bonn, on the Rhine, collected by Dr. John Natterer in North Brazil; and it is probable that the *Holaspis Guentheri* may also be a Tropical-American form.

HOLASPIS GUENTHERI, A. Smith, MS.

Bluish brown (in spirits), with three bluish-white equidistant regular lines down each side of the head, neck, and body, and a stripe down the front of the fore leg.

Hab. — ?

The specimen was purchased in Paris without any habitat affixed to it.

The tail has been reproduced, and the reproduced part is of the normal form, fringed and toothed on the sides, but of a different (that is to say, uniform dull leaden) colour.

The second genus has many characters in common with *Xantusia* of Baird, and will most probably belong to the family *Xantusiidae*, as proposed in the 'Proceedings of the Academy of Sciences,' Philadelphia, for 1858, p. 255.

2. PORIODOGASTER, A. Smith, MS.

Head pyramidal; sides erect; crown flat, hard, bony, covered with very thin polygonal normal shields; superciliary ridge bony, solid; temple covered with a shield; lower jaw thick, bony, solid, covered with a single series of large broad, thin, membranous shields, which are united in a straight line on the middle of the chin; eyes circular, large, lateral, without any eyelids; pupil large, circular; tongue not retractile, broad, flat, attached nearly to the tip, the tip only obscurely nicked; teeth simple; ears oblong, large, with a groove to the angle of the mouth; tympanum sunken; nostrils lateral, anterior in the suture between two nasal shields, the front situated between the upper edge of the rostral and the front odd plate. The sides of the neck and throat covered with round, convex scales of moderate and nearly uniform size. The throat with two folds on each side, and with a cross fold in front of the chest; these folds are covered with scales of the same size and kind as the rest of the throat. The back of the neck, back, and sides of the body covered with uniform, convex, roundish scales, with numerous scattered, larger, prominent, conical, tubercular scales placed in longitudinal rows along the centre of the back, and larger and more abundant ones on the sides. The belly covered with cross series of square flat smooth shields, most of which have a dark large pore-like crypt in the middle of their hinder edge; the shields of the chest are smaller, more numerous, and placed in converging lines. The legs strong, covered with round convex scales; the hinder ones armed with larger prominent tubercles on the upper surface. Toes 5:5, unequal, slender; claws sharp, curved, the under surface covered with flat shields; femoral pores large, distinct. The front of the vent covered with three pairs of equal flat shields, each having a very large crypt in the middle of its hinder edge, the hinder pair next the vent being the largest. The tail cylindrical, tapering, covered above with rings

of square keeled scales, every fourth ring being larger, prominent ; the under side with rings of small square shields.

PERIODOGASTER GRAYII, A. Smith, MS.

Brown, yellowish beneath.

Hab. — ? British Museum.

Mr. Cope, to whom I have shown the specimen of this species, has drawn my attention to the genus *Xantusia* of Professor Baird, noticed in the 'Proceedings of the Academy of Natural Sciences' for 1858, p. 255, which agrees with it in many particulars, but is certainly distinct, though probably belonging to the same family, *Xantusiidae*, which may be characterized by the form of the tongue, the front fold on the throat uniting the ears, and the absence of the eyelids.

Professor Baird describes the pupil of *Xantusia* as vertical ; in our genus it is circular.

This similarity to *Xantusia* makes it probable that this genus is from Lower California.

M. Auguste Duméril, in the 'Revue et Magasin de Zoologie' for 1852, describes and figures a new genus of Saurian under the name of *Lepidophyma flavimaculata* (t. 17), from the province of Peten in Central America, which resembles this Lizard in many particulars ; but he particularly says that it has no femoral pores, which he says are found in all the *Zonures* with which he has compared it.

M. Duméril's genus is probably the same as the *Xantusia* of Baird ; but cannot be the same as the one here described, which is peculiar, not only from having large femoral pores, but pores on the ventral shield as well.

May 12, 1863.—E. W. H. Holdsworth, Esq., F.Z.S., in the Chair.

ON A NEW SPECIES OF CALLISTE FROM COSTA RICA.

BY OSBERT SALVIN, M.A., F.Z.S.

CALLISTE DOWII, sp. nov.

Supra nigra : dorso vix viridi lavato, plumis nuchæ et laterum colli utrinque argentescenti-viridi terminatis, pilei margine postico ochraceo marginato : uropygio argentescenti-viridi, tectricibus superioribus reetricum cyaneis : subtus gula tota nigra : pectore superiore nigro, plumis viridescenti-cinnamomeo terminatis : ventre imo cum crisso et lateribus cinnamomeis, pectore inferiore paulo dilutiore : primariis usque ad terminos, secundariis, tectricibus alarum et reetricibus omnino nigris, pogoniis externis omnium cyaneo marginatis, tectricibus subalaribus albis, vix cinnamomeis ; campterio cyaneo, albo vittato : rostro nigro, mandibulæ inferioris basi albida : pedibus flavo-nigris.

Long. tot. 5·25, alæ 2·9, caudæ 2, tarsi ·75, poll. angl.

Hab. Costa Rica.

This is a very distinct species, and unlike any of the genus. The greenish-silvery feathers of the neck and the green uropygium suggest the group which Dr. Selater unites under the head of *Procnopsis*, as its proper position in the genus, its nearest ally being the New Granadian *C. nigriviridis*, from which, however, it differs essentially.

This makes six species of *Calliste* now known to inhabit Central America and the Isthmus of Panama, viz. *C. larvata* from the hot forest-region of the Atlantic side of Guatemala, *C. Francescæ** from Costa Rica and Veragua, *C. Dowii* from Costa Rica, *C. Frantzii* from the same country, *C. gyroloides*, a species ranging from Costa Rica to Bolivia, and *C. inornata* from Panama to the Isthmus of Darien.

The single specimen of this *Calliste* now described was procured by Capt. J. M. Dow, Corr. Mem. Z.S., at San José, the capital of Costa Rica, during a short visit he paid to that city in the early part of the present year, and by him most kindly presented to me. He was unable to inform me exactly whence it came; but it was most probably obtained from the low forest-region of the Atlantic slope.

I dedicate the species to Capt. Dow, whose researches in the marine fauna of Central America are too well known for me to need to dilate upon the justice of the appellation.

OBSERVATIONS ON THE BOX TORTOISES, WITH THE DESCRIPTIONS OF THREE NEW ASIATIC SPECIES. BY DR. J. E. GRAY, F.R.S., ETC.

The knowledge of the animals of our own country is progressive and only gradually acquired; and how much more so must it be as regards the species which we receive from a distant country, whence we get only isolated specimens, and often in a more or less imperfect condition, without any account of how they live, and what they eat, and in what manner they conduct themselves!

In such cases how can we do more than guess at what is a species, and into what groups the species should be divided? and yet, because we doubt in what we are doing (and the older we become in the study, the more do we see the necessity for doubting, and the more do we see the imperfection of our materials)—yet, on the doubts which arise from such causes and not from any want of faith in the principle that species are permanent, if we only had materials enough to study them properly, do theorists wish to support the theory that species gradually pass into each other, and have been derived, or rather have originated, from such transformations. Never was a theory more baseless, as far as our knowledge is concerned.

This imperfection of our knowledge is specially the case with respect to exotic Tortoises, of which we sometimes only procure the shell, at other times the animal with the shell in a more or less perfect condition; and when the latter is procured, we find that the conclusions that we had come to as regards the probable form of the animal, or some part of it, are more or less incorrect, and we are thus obliged to reconsider the situation the species occupies in the series.

* I had considerable doubts whether this species was really separable from *C. larvata*, but, having examined a number of skins of both species, have come to the conclusion that the distinction, small as it is, is constant. Dr. Sclater has pointed out in his 'Monograph' what the differences are, to which I may add that *C. Francescæ* seems a lighter rather than a brighter bird than *C. larvata*; the blue on the forehead is a trifle broader in the former; and the outer bluish-green margin to the middle wing-coverts of the latter is almost obsolete in the former. In fact, there is just a difference, and that is all.

Having lately received more perfect specimens of some of the Indian Box Tortoises, I am induced to suggest their arrangement as follows:—

The Tortoises belonging to the tribe *Cistudina* are characterized by having the sternum attached to the back by a ligamentous suture on each side, and divided across the centre by a similar cross suture, leaving the front and hind lobe more or less moveable.

In the *normal Cistudinæ*, which have the lobes of the sternum moveable at all ages, the cartilaginous sutures and the suture between the pectoral and ventral shields of the sternum are at the same situation; and the lobes of the sternum are broad, as broad as the opening of the thorax, and cover the legs when they are contracted.

The *normal Cistudinæ* may be divided into genera, according to the more or less aquatic habits of the animal, as indicated by the structure of the feet.

- I. *Sternum-lobes unequal; front shorter, almost free from the symphysis. The hind foot slender, elongate; toes very unequal, second longest.* N. America.

1. CISTUDO.

Thorax convex, solid; sternum rounded or truncated before and behind; the front lobe smaller, almost free from the symphysis. The fore legs with large shields in front; the toes short, enclosed, not webbed, with short conical claws. The hind feet elongate, narrow, with the second toes produced; the rest short, nearly enclosed, not webbed; the soles of the feet with subequal moderate-sized scales, the hinder edge rounded.

N. America.

- * *The hind feet with small hinder or outer fourth toes.* Cistudo.

CISTUDO CAROLINA, Gray, Cat. Shield Rept. B.M. p. 39.

Of which *C. ornata* and *C. major*, Agassiz, seem to be varieties.

- ** *The hind feet without any small fourth toes.* Onychotria.

CISTUDO MEXICANA, Gray, Cat. l. c. p. 40.

See also *C. triunguis*, Agassiz, which is said to be smaller than *C. carolina* and *C. mexicana*.

Dr. Holbrook describes and figures *Cistudo Blandingii* (t. 3) as a separate species, because it has a head like *Emys*, the upper jaw deeply emarginate in front, the front lobe of the sternum less elevated. On these characters Leconte refers it to *Lutremys*, and Agassiz to *Emys*, as restricted by Bonaparte, who regards *E. europæa* as the type. The figures of Holbrook look very like *Cistudo carolina*; but Agassiz, who forms for it a subfamily, describes it as much more depressed. It is probably distinct; but I have never seen an American Box Tortoise that could be arranged or confounded, as Leconte has done this, with our European *Lutremys*. It certainly is not *E. Meleagris* of Shaw, as Agassiz believes.

II. *Sternum-lobes subequal, both forming part of the lateral symphysis.* The Old World.

i. *Hind foot elongate; toes very unequal, nearly free, second longest.*

2. PYXIDEA.

The thorax convex, solid. Sternum flat; lobes rather narrow, truncated in front, notched behind. Legs with large band-like thin shields in front; toes short, scarcely exerted, with band-like shields above, slightly webbed. The hind feet rather elongate: toes slightly webbed, short; the second rather elongate, produced, with a large claw. Claws conical, acute.

PYXIDEA MOUHOTII.

Cyclemys Mouhotii, Gray, Ann. & Mag. N. H. 1862, x. p. 157.

Hab. Lao Mountains, Siam.

The back is flattish and sharply three-keeled.

ii. *The hind foot elephantine; toes subequal.*

3. CISTOCLEMMYS.

Thorax convex, solid. Sternum nearly flat, rounded before and behind; the front lobe large, partly enclosed in the symphysis. The fore feet subclavate; the toes very short, nearly enclosed, not webbed; the claws short, blunt. The hind feet elephantine, subcircular; toes very short, enclosed. Soles with two series of large prominent shields; the hinder edge keeled, but scarcely produced. Tail shielded beneath. Asiatic.

This genus, in the convex and solid structure of the thorax, is like *Cistudo*; but the foot is more like that of the Land-Tortoises; and the hind foot is subcylindrical, instead of elongate as in the American genus.

CISTOCLEMMYS FLAVOMARGINATA.

Dark brown, shields of the back deeply concentrically grooved; the sternum flat, black; the lower side of the margin of the thorax yellow; head olive, temple yellow, with a yellow streak on each side of the crown, becoming wider and triangular behind.

Cuora trifasciata, var., Gray, Cat. Shield Reptiles in B.M. p. 42. Specimen c.

Hab. China (*J. Reeve, Esq.*); Formosa (*R. Swinhoe, Esq.*).

The surface of the shell is often more or less eroded; the one which we first received from Mr. Reeve was so on the whole upper surface. The form of the foot, as well as the height and thickness of the shell, at once separates this species from *Cuora trifasciata*, with which I formerly confounded it.

Mr. Swinhoe informs me that this Tortoise is very abundant in the ponds in the district of Tamsuy, N.W. Formosa. He did not fall in with it in South Formosa, where the *Emys Bennettii** is the prevailing species. He has frequently seen the Tamsuy Tortoise showing its head and the top of its back on the surface of the water

* *Emys sinensis* proves to have been founded on the young state of this species, as is shown by the fine series of specimens brought from Formosa by Mr. Swinhoe.

in ponds about the rice-fields, and has watched them basking, several at a time, on the tops of large stones in such ponds.

- iii. *The hind feet flattened, fringed; toes webbed and with band-like shields above.*

4. CUORA.

The thorax rather convex, more or less three-ridged. The sternum flat; lobes subequal, both enclosed in the symphysis. Head flat at top; eyes lateral. The front of the fore legs with large scales. The toes all banded above, webbed. The claws conical. The hind feet depressed; the hinder edge fringed and angularly produced. Asiatic.

- * *The head large, flat, with two yellow streaks on each side; back one-coloured; toes broadly webbed.* Cuora.

CUORA AMBOINENSIS, Gray, Cat. Shield Reptiles B.M. p. 41.

Hab. Amboina; Gilolo (*Wallace*); Borneo (*Wallace*).

- ** *Head smaller, oblong, with two dark streaks on each side; back three-banded; toes narrowly webbed.* Pyxiclemmys.

CUORA TRIFASCIATA, Gray, Cat. Shield Rept. B.M. p. 42.

Hab. China.

5. LUTREMYS.

Thorax depressed. Sternum flat; lobes subequal, both enclosed in the symphysis. Head ovate; eyes superior. The legs with large scales in front. The feet depressed; toes webbed, banded above; the hind feet fringed and angularly produced behind. Claws elongate, acute.

LUTREMYS EUROPÆA, Gray, Cat. Shield Reptiles B.M. p. 40.

Hab. Europe.

Very variable in colour.

- iv. *Toes webbed; they and legs covered with very small scales; front legs only with thin band-like plates in front; the lobes of the sternum narrow.*

6. NOTOCHELYS.

Back convex, flattened above. The sternum flexuous; lobes rather narrow, truncated in front and behind. The legs and toes covered with minute scales; the front legs having a series of broad, thin, band-like shields in front. Toes webbed. Claws acute.

This genus is like a true *Emys* in most of its characters; but the sternum is scarcely raised above the underside of the margin, and is united to the thorax by a cartilaginous symphysis; the lobes are separated by a straight depressed suture, but scarcely moveable. It differs from all the other *Cistudinæ* in the legs and toes being covered with minute lanceolate scales as in *Batagur*, with only a few very narrow shields near the claws.

NOTOCHELYS PLATYNOTA.

Emys platynota, Gray, P. Z. S. 1834, p. 54.

Cyclemys platynota, Gray, Cat. Shield Reptiles B.M. p. 43.

Hab. Sumatra; Singapore (*Wallace*).

The head with a pale streak on each side, extended down the upper part of the sides of the neck.

The young specimens have one small black spot on the back edge of the areola of the costal, and two on the back edge of the areola of the vertebral plates.

In the *aberrant Cistudinæ* the lobes are only moveable in the young state; the suture that divides the bones of the sternum into two parts is straight and transverse, while the front edge of the pair of ventral shields overlaps its edge and forms a sinuous line in front of the suture. The lobes of the sternum are narrower than the opening of the thorax, as in *Emys*, and do not cover the legs when they are contracted.

This genus forms the transition to the Tortoises with solid and fixed sternum; but it is easily known from them by the sternum being scarcely raised above the margin of the thorax, and by the existence of the cartilaginous sutures between the sternum and thorax.

7. CYCLEMYS.

The thorax convex or depressed. The sternum flat or slightly convex, with the lateral symphysis well marked, truncated before and notched behind; the cross suture indistinctly marked and narrow, more or less obliterated in the adult, covered with the produced front edge of the ventral shields. The legs covered with large, band-like, thin plates in front. The toes banded above; the front one short, webbed. The hind feet flattened, with the toes broadly webbed; the hinder edge keeled and angularly produced.

* *Thorax depressed, suborbicular.*

1. CYCLEMYS ORBICULATA, Bell, P. Z. S. 1834, p. 17.

Cyclemys dentata (adult), Gray, Cat. Shield Reptiles B.M. p. 42, t. 19.

Shields brown-rayed.

Hab. Java.

The small figure of *Emys dentata* of my 'Illustrations of Indian Zoology' represents, I think, probably the young of *Geoemyda grandis*, Gray (Ann. & Mag. N. H. 1860), judging by the series of specimens brought by M. Mouhot from Camboja. The larger figures are those of a young *Batagur*.

** *Thorax oblong, convex.*

2. CYCLEMYS OLDHAMII.

Thorax oblong, convex; back flattened, bluntly keeled, and with a convexity in front, and two acute prominences at the end of the two last vertebral shields; costal plates rather convex, with the areola on the upper hinder margin; shields concentrically striated, brown, with some black lines on the part of the costal shield near the lateral keels; margin toothed behind. Thorax flat; shields pale, with dark rays.

Cistudo dentata (adult), Gray, P. Z. S. 1856, p. 183; Bell, Testudinata, t. (with animal)?

Hab. Mergui (*Professor Oldham*); Siam (*M. Mouhot*).

I was formerly inclined to believe this was an adult of the former species; but we have lately received a second specimen, which proves that it is perfectly distinct.

3. CYCLEMYS OVATA.

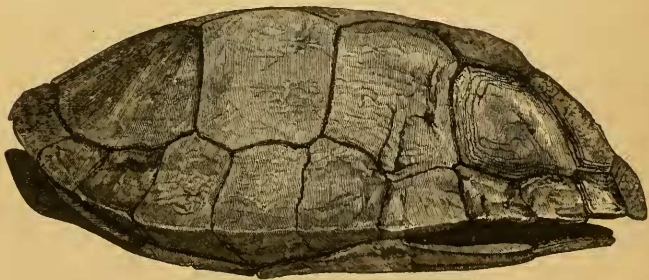
Thorax ovate, grey-brown, convex, hinder edge acutely dentated; the middle of the back rather flattened, bluntly keeled in front and above, and acutely keeled on the shelving hinder parts; the side shelving, the front slightly and the hinder part rather deeply impressed; the upper part of the costal plates convex; the sternum pale grey-brown.

Hab. Sarawak (*Wallace*, no. 138).

The specimen is not in a good state; probably the animal had been in confinement and was out of health; the cross suture on the sternum is much eroded on the edge, and the shell seems to be discoloured.

There is a second specimen, which was presented to the British Museum by Sir Andrew Smith, C.B., without any habitat, which is perhaps a younger stage of the species; but it does not show any mark of the transverse suture on the sternum, and the marginal plates are all broad and equally so, while, in the specimen from Borneo, the fourth, fifth, and sixth lateral marginal plates are much broader than the others on each side, and ascend up into the margin of the costal ones; and the sides of the shell are rather more convex in front, and only slightly and not so deeply impressed behind.

The shell is uniform pale brown above, and brown below, with regular close radiating paler rays, which are wider and more distinct



near the margin of the shield. The areola on the vertebral shield is close to the hinder margin, near the upper hinder angle of the costal shields, and it is near but not on the hinder outer edge of the sternal shields.

The dried animal is brown; the front edge of the fore legs is covered with irregular-sized scales.

Mr. Bell, in his 'Testudinata,' gives two figures of the underside of the shell of his *Cyclemys orbiculata*; and in his text says that he

cannot assent to M. Bibron's referring this species to the genus *Cistudo*. These undersides evidently represent two distinct species; and the upper figure of the two shows the very cross suture the existence of which Mr. Bell denies.

The lower figures represent the sternum of *Cyclemys orbiculata*, with the lobes, especially the hinder ones, narrower than the openings in the thorax.

The upper figure represents a species where the lobes are broad and rounded, and nearly as broad as the aperture in the thorax.

It indicates the existence of a species which has not occurred to me, and to which the name of *C. Bellii* may be applied. Perhaps it is one of the specimens which he received from either Madras or Bombay; for he says he has received them from those countries as well as from China; and I have not seen any specimens of the genus from either of these two localities.

All the three specimens of this species in the British Museum have the lobes of the sternum narrow, like the lower figure. The figure of the shell with the animal in Mr. Bell's work better represents *Cyclemys Oldhamii* than the depressed, flattened *C. orbiculata* of Java.

MISCELLANEOUS.

Notes on Pustularia rosea, Gray, and Hyalonema.

By Dr. J. E. GRAY, F.R.S. &c.

IN Mr. Dallas's translation of Prof. Schultze's paper on *Polytrema miniaceum* (Annals, ser. 3. vol. xii. p. 411), it is stated that I have given to *Polytrema miniaceum* the new name of *Pustularia rosea*. This is a mistake: *Pustularia* is quite distinct from *Polytrema*. The latter genus is well known to me. *Pustularia*, if a Foraminifer, is nearly allied in external form to the genus *Lepralia*, and very unlike the massive *Polytrema*.

Having my pen in my hand, I may observe that I cannot agree with Prof. M. Schultze in regarding the spicula in *Carpenteria* or *Polytrema* as parasitic and part of a Sponge, any more than I can agree with him and Dr. Bowerbank in regarding the fibres of *Hyalonema* as the spicula of a Sponge which is covered with a parasitic *Zoanthus*.

Note on Ophiolepis gracilis (Allman), from the Brick-Clay of Seafeld. By ROBERT WALKER.

Specimens of this Starfish were found for the first time, about a year ago, in brick-clay near Dunbar. Prof. Allman described the species at a meeting of the Royal Society of Edinburgh, in March last. The following remarks will show the condition of the Seafeld specimens, and may assist in determining the species, if found in other quarters.

None of the specimens have the disks sufficiently preserved to show clearly the arrangement of the dorsal plates; and in one or two instances only can the form of the radial shields be made out. Their